A Prospectus for Participation by Foreign Governments in *FutureGen*

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Introduction

The electricity and transportation sectors are responsible for more than half of worldwide anthropogenic carbon dioxide emissions from fossil fuel use. To significantly reduce these emissions and to preserve the security and cost benefits of using fossil fuels, the engineering, economic, and environmental viability of fossil-based energy systems with zero emissions must be validated.

President Bush announced that the United States has committed to proceed with a nominally one billion U.S. dollars, 10-year research project to build the world's first coal-fueled plant to produce electricity and hydrogen with zero emissions. In response to this announcement, the U.S. Department of Energy unveiled plans for FutureGen – a bold step toward defining a key pathway to meet the climate challenge. The FutureGen plant will establish the technical and economic feasibility of producing electricity and hydrogen from coal –- a low-cost and abundant energy resource –- while capturing and storing the carbon dioxide generated in the process.

An Invitation to Participate

Gaining worldwide acceptance of the concept of sequestration is a key goal of our Carbon Capture and Storage Initiative of which the FutureGen project, while a separately operated program, is an important component. Thus, the U.S. Department of Energy is inviting international involvement in this project. This prospectus provides a framework for foreign governments to join with the U.S. Department of Energy in undertaking FutureGen. It outlines the

- FutureGen project
- Benefits of international participation
- Participation mechanisms for non-U.S. entities

Forms of Participation

Opportunities for international participation in FutureGen can take on several forms, such as:

- Government to Government cooperation including participation on the Government Steering Committee (GSC) through cost-sharing
- Membership of foreign coal producers and coal-fueled electric utilities in the Consortium subject to terms and conditions of the Consortium
- Open and fair competitive opportunities for equipment vendors and engineering services to bid on FutureGen procurements
- Academic scientists and researchers participation in FutureGen testing

What is FutureGen?

FutureGen is a large-scale research project that will result in a first-of-a-kind energy plant that showcases the best technology options for using coal to produce electricity and hydrogen with zero emissions. The U.S. Department of Energy envisions the plant will employ coal gasification technology and be nominally sized to produce 275 MW equivalent gross electricity output. The large scale of the FutureGen plant is driven by the need to adequately validate the engineering, economic, and environmental viability of coal-based, zero emissions technologies.

Power generation and hydrogen production will be integrated with the capture of carbon dioxide and its storage in deep, stable underground geologic formation(s). FutureGen will seek to sequester carbon dioxide emissions at an operating rate of one million metric tons per year in order to adequately stress test a representative portion of a geologic formation (with a capability up to two million tons per year). The plant will also meet stringent limits on all other environmental emissions associated with coal use. Thus, the plant will showcase the capability of technology to virtually eliminate environmental concerns associated with the use of coal.

The initial FutureGen plant configuration will incorporate cutting edge technologies to address scaling and integration issues for coal-based, zero emissions energy plants. The plant will be operated as a research facility – it will test and validate additional advanced technologies as they emerge from research programs. These advanced technologies will offer the promise of clean environmental performance, at a reduced cost and increased reliability. Thus, FutureGen will be designed and constructed with the flexibility to conduct both full scale operational and subscale platform tests of such scalable advanced technology over the entire operational phase of the project.

How is FutureGen Being Implemented?

The ultimate success of FutureGen depends on acceptance of the concept of carbon capture and storage by the industries that will be most heavily impacted by potential future limitations on carbon emissions. Thus, the U.S. Department of Energy has entered into a cooperative agreement with the FutureGen Industrial Alliance, a non-profit consortium led by the coal-fired electric power industry and the coal production industry. This consortium will be responsible for the design, construction, and operation of the FutureGen plant; and, for the monitoring, measurement, and verification of carbon dioxide sequestration from the plant. However, the U.S. Department of Energy anticipates it will provide an independent validation of carbon dioxide capture and storage for the FutureGen project. The Alliance is expected to contribute approximately $250 million U.S. dollars in industry cost share towards the estimated $950 million U.S. dollars (in 2004 dollars) total project cost.

The Alliance membership currently is comprised of companies which collectively owns and produces over 40 percent of U.S. coal, and about 20 percent of U.S. coal-fueled electricity, and international coal producers and coal-based utility companies. The U.S. Department of Energy expects the Alliance to be an "open" consortium – working to expand its initial membership to one that includes other interested coal producers and coal-fueled electricity generators in both the United States and abroad. Terms and conditions for inclusion of these additional entities will be determined by the Alliance. The U.S. Department of Energy expects the Alliance to encourage and provide mechanisms for future participation in the project, as appropriate, by interested parties including state and local governments, regulators, and the environmental community.

The Alliance will use a fair and open competition to select a host site in the United States. It will also use a fair and open competition to select engineering, design, and construction services, and major equipment modules. The mechanism for foreign (and domestic) equipment and service vendors to participate in FutureGen is through this competitive selection process for their goods and services.

What is the Government Steering Committee?

The U.S. Department of Energy envisions that a Government Steering Committee (GSC) will be a group of officials from the U.S. Government and participating foreign governments. The GSC's role is to provide guidance and input to the Department of Energy with respect to the design and requirements of the research and testing program for FutureGen. The Committee will be chaired by a representative from the U.S. Department of Energy. U.S. government representation would also include additional officials from the U.S. Department of Energy.

The GSC will have the opportunity to review, advise, and influence the requirements and scope of research that FutureGen is expected to address to achieve the test objectives. Under the guidance of the U.S. Department of Energy's program management officials, it will have the opportunity to review the project progress and overarching key / major milestones. It will also have the opportunity to propose cost-effective options, provide input, information and lessons learned based on prior experience for consideration by U.S. Department of Energy officials in making decisions on project features including:

- Functional and design requirements of the FutureGen plant with respect to meeting the research and test objectives
- Test plan for the operational period
- Sequestration protocol
- Monitoring plan for sequestration

The GSC will have the opportunity to:

- Suggest adding new coal and utility members to the Alliance
- Suggest involving other interested parties in Alliance activities
- Make non-proprietary performance data publicly available so interested parties can evaluate the viability of coal-fueled, zero emissions energy plants

In addition, members of the GSC will have the opportunity to nominate:

- Government and academic scientists and researchers from their respective countries to participate on technical subcommittees that review the testing aspects of the project under terms and conditions determined by the Alliance
- Advanced technologies to be supplied by a participant for testing at the FutureGen facility
- Coals from their countries for testing at the FutureGen facility

How Can Foreign Governments Participate?

This Prospectus encourages foreign governments to participate in FutureGen. The U.S. Department of Energy's vision is that all major coal producing or consuming countries will have an interest in participating. The mechanism for participation is through membership on the GSC.

A foreign government can terminate its membership on the GSC at any time by notifying the Chairperson and all GSC member nations in writing. At such time, all benefits from participating in FutureGen will cease and any portion of previous contributions will not be returned.

What are the Benefits to Foreign Governments?

A key benefit of participation in FutureGen is timely access to non-proprietary data from the world's first large-scale, integrated, zero emissions test facility. This data is needed to support future policy and regulatory decisions concerning greenhouse gas reductions. Membership on the GSC will provide a "seat at the table" while definitive cost, performance, and environmental data for carbon capture, transport, and storage are developed, and technology standards and protocols to measure, monitor, and verify carbon dioxide capture and storage are established.

FutureGen will also provide other important overarching benefits to each of the participating nations.

- It will leverage each nation's investment in research. Collaborative research and development led by a broad cross section of world leaders in the coal and power industries is the most cost-effective approach to test and validate coal-fired, zero emissions technologies.
- It will allow each nation to claim an international leadership role in a collaborative effort towards a sustainable, global solution to the climate change concerns over the use of fossil fuels, especially coal.
- The nations participating in cost-sharing will have the opportunity to gain first hand, knowledge (non-proprietary information) regarding the design rationale and operating experience from a first–of-a-kind integrated facility leading to a conceptual design of a similar class plant for that nation. This knowledge can provide the design basis and operating parameters for replication of – or improvements to – follow-on integrated plants by the participating nation in its own country, or elsewhere in the world.
- It will provide affordable technological solutions to greenhouse gas reductions on an accelerated schedule. International collaborative research accelerates technology development and acceptance by capitalizing on expertise from around the world. Affordable energy solutions have positive impacts on the economies of nations.

How Can Non-U.S. Based Industrial Organizations Participate?

The U.S. Department of Energy expects the Alliance to expand its initial membership to include U.S. and non-U.S. based coal and coal-fueled electricity companies. Non-U.S. based equipment and service vendors may participate in FutureGen through the

competitive selection process for their goods and services. The FutureGen project will be located in the United States. For all other aspects of the project, the U.S. Department of Energy's goal is for the Alliance to be organized such that U.S. and non-U.S. based organizations are treated equally.

What are the Benefits to Non-U.S. Based Industrial Organizations?

The definitive cost, performance, and environmental data produced by FutureGen (that is non-proprietary) will give non-U.S. based industrial organizations the ability to

- Develop and understand options for coal-fueled power and hydrogen plants using zero emissions technologies
- Reduce the cost of meeting possible future limits on carbon emissions
- Have fact-based information to help shape public policy and regulations related to carbon capture and storage
- Evaluate early-stage investment opportunities in carbon capture and storage technologies, and technologies to produce hydrogen from coal
- Establish coal as a viable, reliable indigenous source of produced hydrogen for the transportation sector

How Will Intellectual Property Be Handled?

The U.S. Department of Energy will work with the members of the Alliance to develop intellectual property provisions that balance the competing needs of the various entities participating in FutureGen. Guiding principles will be

- All intellectual property arrangements involving domestic and foreign technology providers should be structured to maximize the potential to commercialize the technology being developed
- Non-proprietary information on the engineering, environmental, and cost performance of FutureGen must be made publicly available to enable all interested parties to evaluate the viability of coal-fueled, zero emissions energy plants

- Information that is "proprietary" will not be available.

Where Can Additional Information on FutureGen Be Obtained?

The FutureGen program is under development. As additional information becomes available, it will be posted on the U.S. Department of Energy's Fossil Energy Website *at http://www.fe.doe.gov*. The following Department officials can be contacted for more information regarding FutureGen:

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